

## ABSTRACT

Two apparatuses are disclosed for screening a compound by monitoring its interactions with a specimen having fluorophore loaded target cells. The first apparatus comprises an optical illumination unit comprising a light source wherein light from the light source is directed to illuminate the specimen; a fluorescence discrimination unit which is coupled to receive emitted light from the specimen and separate at least three emitted wavelengths of light from said emitted light; and a fluorescence detection unit which is coupled to the fluorescence discrimination unit counts photons emitted by the wavelengths of emitted light. The second apparatus comprises a two-dimensional acousto-optical scanning system for use in the apparatus for screening drug candidates is also disclosed. The two dimensional acousto-optical scanning system is based on two perpendicular acousto-optical modulators, spaced so that each is within the range of deflection of the first order beams of the other modulator. A method of screening a compound by monitoring its interactions with a specimen having fluorophore loaded target cells is also described. The method comprises the steps of coupling a light source to the specimen to illuminate the specimen; separating at least three wavelengths of light emitted by the specimen, and detecting photon counts from the three emitted wavelengths of light. Also disclosed is a waveform modulated light emitting diode (LED) system for used as a light source for the apparatus for screening a compound by monitoring its interactions with a specimen having fluorophore loaded target cells.